

Model Maintenance Scoping

Client: Scottish Water



Scottish Water holds a library of hydraulic models covering the majority of the urban areas of Scotland. Over the years many hydraulic models have been created and developed for specific catchment needs and project drivers.

There was a requirement to maintain the modelling library and rationalise the number of databases and network models. This allowed Scottish Water to identify a single master database for each catchment area.

Caley Water has supported this programme of work and completed 41 model maintenance scoping studies, which represents approximately 20% of the modelled areas in Scotland.

Historically, models have been established based on 'drainage areas,' which do not necessarily represent all of the network in a catchment draining to a wastewater treatment works. Scottish Water wanted to develop models which were representative of the full sewer network draining to each WwTW.

The available databases were interrogated in conjunction with the supporting documentation to establish the most up to date network model(s) which represents the current sewerage network. In some cases models were integrated to establish the new model.

The work also involved rationalising the data flags in the model to a single set. This required the judgement of senior staff to determine the most appropriate corresponding flags to adopt in the new model. This was an important step as the data flags are used as an indicator of confidence in the quality of the model.

Model Field	Flags	Number of modelled assets	No. of possible flags	No. of modelled flags	Model Checked	Flags Out
Nodes (16 Flags)	16	690	11040	11040	OK	0
Conduits (15 Flags)	15	682	10230	10230	OK	0
Flap Valve (4 Flags)	4	0	0	0	OK	0
Orifice (6 Flags)	6	0	0	0	OK	0
Pump (5 Flags)	5	3	15	15	OK	0
Sluice (6 Flags)	6	1	6	6	OK	0
Weir (7 Flags)	7	6	42	42	OK	0
Subcatchment (39 Flags)	39	145	5655	5655	OK	0
Subcatchment (Non Runoff - 14 Flags)	Total count of subcatchment flags (2 Counts req'd due to formulaic constraints)			2030		
Subcatchment (Runoff - 25 Flags)				3625		

Following establishment of each master network, we completed a scoping exercise. This was to identify the model maintenance

requirements to bring the model up to current Scottish Water standards and meet the specification. This allowed the client to quantify the costs of the model maintenance programme in the future.

Services Provided

- Review and interrogation of historical modelling databases and reporting to establish the most current and up to date model.
- Integration of models to establish sewerage area models. Review and maintenance of clashing parameters to ensure that models were compatible.
- Review existing model flags and undertake re-flagging exercise to current SW standards.
- Model audit of critical parameters. Complete scoring matrix to determine confidence classification.
- Complete an inception workshop with key stakeholders to identify catchment issues and project drivers. Information used to establish prioritisation for future model maintenance.
- Undertake a scoping exercise for future model maintenance including model update and data collection requirements.
- Identify locations and prepare plans for Manhole, CCTV and Flow surveys.
- Costing exercise for consultancy fees and survey for future model maintenance.
- Prepare reporting in accordance with specification.

Solutions and Added Value

The models themselves are one of Scottish Water's key assets as they are used to support a wide range investment strategies, including development growth, flood investigations and environmental drivers to comply with current legislation and targets from the regulators. This was a key programme of work to set a new baseline for future capital investment.

Caley Water has extensive experience of working on projects across Scotland for a variety of drivers including growth, flooding and environmental. We have worked with Scottish Water over a number of years through various investment cycles and been involved in progressing the various modelling programmes. We therefore understand the client drivers for the project and have been able to apply our understanding of the client organisation to add value to this model maintenance scoping project.

We have drawn on our extensive experience of managing large programmes of small projects to effectively deliver the projects on time and within budget. We were one of six consultants working on this programme. The feedback we received from the client was very positive and led to further awards of work on this programme; hence delivery of a significant proportion of the programme of work.